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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,445

12/27/2005

Francis Garnier

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OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER

PILLING, CHRISTOPHER D

ART UNIT

PAPER NUMBER

4118

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,445	Applicant(s) GARNIER, FRANCIS	
	Examiner CHRISTOPHER PILLING	Art Unit 4118	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/01/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6, 8-16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Willis (US 6,314,317).

3. Regarding claim 1, Willis discloses a electrically controlled fluidic valve 10 (Fig 2) separating two volume spaces, it comprises: at least one microporous membrane 13 (Fig 2) the surface of which is at least partly covered with at least one electroactive polymer 20 (Fig 3) essentially placed within the pores 14 (Fig 2/Col 2, lines 16-18) of said microporous membrane 13 (Fig 2), so that, when said polymer is in a defined oxidation-reduction state (Col 7, lines 4-13), it blocks off said pores (Col 1, lines 38-42); and an electrical supply (Col 16, lines 3-8) intended to allow said valve to switch from the closed state (Fig 3A) to the open state (Fig 3B), and vice versa, by changing the oxidation-reduction state of the electroactive polymer 20 (Fig 3).

4. Regarding claim 2, Willis discloses the microporous membrane 13 (Fig 2) has approximately circular pores 14 (Fig 2) of approximately constant diameter (Col 5, lines 34-35).

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5. Regarding claim 3, Willis discloses the electrical (Col 16, lines 3-8) supply has at least one electrode ("working electrode" Col 16, line 7) and at least one counterelectrode ("auxiliary electrode" Col 16, lines 7-8).

6. Regarding claims 4 and 5, Willis discloses that the electrode is formed by the microporous membrane ("non-conductive material" Col 6, lines 17-19); characterized in that the microporous membrane 13 (Fig 2) is made of a nonconductive material (Col 5, lines 13-14).

7. Regarding claim 6, Willis discloses that the nonconductive material is "NUCLEOPORE7 - a polycarbonate" (Col 5, lines 24-30).

8. Regarding claim 8, Willis discloses that the membrane further includes at least one external metal layer (Col 5, lines 63-65).

9. Regarding claim 9, Willis discloses that the membrane further includes at least one intermediate polymeric layer to which the external metal layer is fastened (Col 6, lines 13-16).

10. Regarding claims 10 and 11, Willis discloses that the microporous membrane is made of a conductive material (Col 5, lines 21-24); characterized in that the conductive material is a metal taken from the group comprising: gold, platinum, palladium or any other equivalent material (Col 5, lines 18-24).

11. Regarding claim 12, Willis discloses that the electroactive polymer is a conjugated polymer such as polyaniline (Col 2, lines 44-49).

12. Regarding claim 13, Willis discloses that the pore diameter lies in the range from 0.1 to 5 microns, preferably from 0.2 to 1 microns (Col 5, lines 44-51).

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13. Regarding claim 14, Willis discloses that the microporous membrane has a thickness lying within the range from 10 microns to 1 mm, preferably from 10 to 30 microns (Col 5, lines 44-51).

14. Regarding claim 15, Willis discloses a microfluidic device, characterized in that it includes at least one valve (Col 4, lines 54-58).

15. Regarding claim 16, Willis discloses a process for producing a valve characterized in that it comprises the following steps:

a) a microporous membrane is placed in an electrolytic solution containing at least one monomer (Col 9, lines 6-14);

b) an electrochemical current is induced in said electrolytic solution (Col 9, lines 32-35);

c) the monomer is fixed on to the microporous membrane, and especially in the pores of said membrane (Col 9, lines 13-21);

d) the radial polymerization of the monomer in the pores of said membrane is carried out (Col 9, lines 13-21); and

e) the polymerization is stopped by cutting off the electrochemical current when the polymers reach the center of the pores, so that said polymers block the pores without overlapping one another (Col 10, lines 23-33).

16. Regarding claim 18, Willis discloses a process characterized in that the monomer is taken from the group comprising: pyrrole, thiophene and derivatives thereof (Col 8, lines 12-17).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willis (US 6,314,317) in view of Campbell (US 3,681,209).

19. Regarding claim 7, Willis discloses all the claimed features except for the nonconductive material is a polymer such as, cellulose nitrate. Campbell teaches wherein the nonconductive material is a polymer taken from cellulose esters or cellulose nitrates (Col 2, lines 34-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the device in Willis to select the nonconductive material of cellulose nitrate, as taught and suggested by Campbell, for the purpose providing a membrane made of a nonconductive material that has high cohesive strength (Col 1, lines 13-20) .

20. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willis (US 6,314,317) in view of Irie (US 5,314,606).

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21. Regarding claim 17, Willis discloses all the claimed features including, a prior step of metalizing (Col 6, lines 30-33) the microporous membrane when said membrane is made of a nonconductive material (Col 5, lines 24-30), said metallization step comprising the following substeps:

a') a microporous membrane is placed in a monomer solution (Col 6, line 30; Col 9, lines 13-14); b') the monomer is fixed onto the microporous membrane (Col 9, lines 13-21); c') the polymerization of the monomer is carried out over the entire surface of the membrane so as to obtain a polymer layer (Col 9, lines 6-12), except for, d') the membrane thus obtained is placed in a solution containing at least one metal salt; and e') the electrodeposition of the metal on the polymer layer is carried out by an oxidation-reduction reaction so that the microporous membrane is covered with a metal film.

Irie teaches, d') the membrane thus obtained is placed in a solution containing at least one metal salt (Col 4, lines 22-35); and e') the electrodeposition of the metal on the polymer layer is carried out by an oxidation-reduction reaction so that the microporous membrane is covered with a metal film (Col 4, lines 22-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the process in Willis to include steps "d')" and "e')", as taught and suggested by Irie, for the purpose of coating the microporous membrane with a suitable metal layer to gain the advantages and desired characteristics of the metal.

22. Regarding claim 19, Willis discloses all the claim features except for the metal salt is gold chloride. Irie teaches that the metal salt is gold chloride (Col 4, lines 40-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

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invention was made to modify the process in Willis to include a metal salt of gold chloride, as taught and suggested by Irie, for the purpose of coating the microporous membrane with a metal layer of gold compound to gain the advantages and desired characteristics of the gold compound, such as resistance to corrosion.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER PILLING whose telephone number is (571)270-7825. The examiner can normally be reached on Monday - Friday, 9am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quang Thanh can be reached on (571)272-4982. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. P./
Examiner, Art Unit 4118

/Quang D. Thanh/
Supervisory Patent Examiner,
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